BUILDING CRM USING MERN STACK

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Abstract- Customer Relationship Management (CRM) software is pivotal for organizations to manage interactions with current and potential customers efficiently. It presents the development of a CRM software solution using the MERN stack (MongoDB, Express.js, React, and Node.js). The primary objective is to ensure that customer data is handled systematically and effectively, improving the overall customer management process. The software leverages MongoDB for robust data storage, Express.js and Node.js for a scalable backend, and React for a dynamic and responsive user interface. Through this implementation, the CRM software demonstrates enhanced data organization, seamless user interaction, and improved data handling efficiency. The findings suggest that the MERN stack provides a powerful and flexible foundation for developing comprehensive CRM solutions, ultimately contributing to better customer relationship management and business performance. Our work not only provided immediate benefits to our clients by enhancing their digital platforms but also contributed to the field of the video data management through the development of our semantic search model.

Index Terms- CRM, Mongo DB, Graphic Design, Express.js.

I. INTRODUCTION

Client relationship management (CRM) is the process through which a company manages all aspects of the client relationship, including prospecting, sales, and service. CRM systems attempt to give insight into and enhance the company/customer relationship by combining all of these aspects of customer contact into one picture. CRM is all about acquiring, developing, and maintaining happy, loyal customers while also achieving profitable growth and delivering economic value to a company's brand. CRM is not a new idea; it is an age-old practice that is gaining traction owing to the advantages it offers, especially in today's market. CRM is a discipline that focuses on automating and improving business operations in the areas of sales, marketing, customer service, and support that deal with maintaining client relationships.

As part of our ongoing projects focusing on Yati as CRM software, we have embarked on developing our own CRM software tailored to streamline data extraction from diverse customers and clients

II. LITERATURE REVIEW

Following paragraphs describing the research works and its finding carried by various researchers.
It's important to highligh Zeng, et al. (2003), who detailed what sustainable CRM entails through four key characteristics: increasing customer satisfaction, providing sales information, differentiating and personalizing services, and recognizing customer needs. According to Xu and Walton (2005),

design base shear corresponding to inelastic response. Manual computations or FEM methods were used to obtain stiffness and strength parameters. Reduction in stiffness and increase in energy dissipation capacity influences response of structure during ground shaking. During excitation of the building to large deformation, stiffness decreases and its capacity to dissipate energy increases. Experiments were done on one storey one bay frames. Results confirmed that response of the STEEL framed structure can be approximated by linear response using a reduced stiffness and substitute damping. Substitute damping helps in understanding the effects of inelastic response in RC structures.

Humar and Wright (1977) studied the behavior of steel frames with setbacks by usingone ground motion. Many observations were made which are listed as follows: They found story drifts to be larger in the tower parts of set-back structures than those for the regular structures. On the other hand, smaller story drifts were found in the base parts of set-back structure as compared to the regular structures. They concluded that the difference in elastic and inelastic story drifts between set-backand regular structures depends on the level of story considered.

Setback of 90% will decrease fundamental period by 35%. As tower becomes more slender the contribution of higher modes becomes more and more prominent. With setback of 90 %

the most important part of implementing a CRM strategy is proving customer satisfaction, retaining existing customers, providing strategic information, and ensuring customer lifetime value CRM assists businesses through a customer knowledge management strategy to focus on marketing principles and customer-oriented promotion, aiming to retain existing customers and acquire new ones, thereby increasing efficiency and reducing costs (Gil-Gomez et al., 2020). The information system is a critical aspect of CRM. The success of the entire CRM concept depends on good information support in terms of quality databases, technology, and applications (Naim, 2021).

Business success depends on efficient information exchange between customers and service or product providers. Communication tools that utilize information technology enable faster and two-way information exchange, providing an additional basis for co-creating value through CRM strategies (Itani et al., 2020). Chen and Popovich (2003) define CRM as the integration of technology, people, and processes when building long-term relationships with clients and stakeholders. Verhoef and Langerak (2002) have observed that marketing and technology are key components of CRM strategy. They note that CRM has deep roots in marketing but is always associated with software usage. According to these authors, CRM is based on three aspects of marketing management: customer relationship orientation, marketing, and marketing databases (Verhoef & Langerak, 2002). Customer relationship management encompasses strategies and technologies that enable tracking and managing data throughout the customer's lifecycle. In Sahoo's study (2020), the bank utilizes CRM to attract new clients by assessing the value they bring based on previously collected data. According to Yapanto et al. (2021), banks benefit from referrals from loyal customers and align their strategies with customer satisfaction. The importance of customer satisfaction is highlighted in determining long-term customer loyalty. Organizations gain competitive advantage through customer loyalty, and to secure this, companies invest significant resources in product, service, and process innovations (Al-Okaily et al., 2022). The study by Magatef et al., (2023) shows that trust and commitment to the organization generate loyalty. Responding effectively to customer needs is crucial for retention and growth. Branch employees prioritize quick, efficient service delivery and building strong customer relationships. To maintain loyalty, businesses shouldn't compromise their partnership with customers (Yapanto et al., 2021).

To develop a quality relationship with customers, banks were among the first to adopt the CRM concept. The primary reasons banks adjust their business processes to meet customer needs are to retain existing customers and attract new ones, encourage customers to collaborate, and inform customers about their portfolio of products, services, and communication channels (Laketa et al., 2015). The study by Gopalsamy and Gokulapadmanaban (2020) discusses the relationship between CRM and customer satisfaction. A positive correlation suggests that an increase in these two factors leads to an increase in in

customer loyalty. According to all of the above, CRM is a business strategy that enables organizations to understand their

customers' existing and potential needs based on past experiences. This helps the organization predict its actions and potential demands. In today's business environment, where there is a highly developed digitalization of society as a whole, only those organizations relying on the CRM business concept will experience business success

CRM will enable employees to correspond better, providing the most personalized service possible, which in turn increases job security with the customer. Thus, by implementing CRM, employees who come into direct contact with customers have good tools to collect and utilize more customer data to achieve a more profitable business with the customer, all through a proactive approach. In the case of a bank, managers involved in building customer relationships (such as account managers, relationship managers, advisors, etc.) will spend more time nurturing that relationship rather than resolving internal issues among employees within the branch related to service delivery to the customer (Madill et al., 2007). Al Duwailah and Ali (2013) assert that an organizational culture that prioritizes adaptive learning and customercentricity can positively influence both internal collaboration and the organization's external relationships. Organizational culture refers to a set of assumptions, values, and beliefs held by employees within an organization. Organizational culture must value flexibility and adaptability while maintaining stability and control over positive values (Limaj & Bernroider, 2019). The culture of an organization manifests itself in its climate, and nurturing incorrect values can lead to employee dissatisfaction, further affecting performance and stakeholder relations (Paais & Pattiruhu, 2020). Values are key drivers of behavior and attitudes (Schwartz, 2012). Schwartz (1992) identifies eleven key values: Universalism, Self-direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Spirituality, Benevolence. Each of these values is defined by the sub-values it includes (Schwartz, 1992). The relationships among values are dynamic; certain values may conflict with others (e.g., the pursuit of change and traditional values), while others may be compatible (values of achievement and power) (Schwartz, 2012).

III . METHODOLOGY

The development of the CRM software using the MERN stack follows a comprehensive and integrated process, ensuring efficient customer data management from initial interaction to backend processing and storage. When customers first engage with the CRM system, they are met with a dynamic and responsive user interface designed using React. This front-end component is crafted to provide a seamless user experience, enabling customers to easily navigate the system and perform various tasks such as adding new customer profiles, logging interactions, scheduling follow-ups, and accessing detailed analytics. React's component-based architecture allows for a highly modular and maintainable codebase, ensuring that the user interface is both intuitive and efficient.

The data management aspect of the CRM system is handled by MongoDB, a NoSQL database known for its flexibility and scalability. MongoDB is designed to handle large volumes of structuredand unstructured data, making it an ideal choice for a CRM system that needs to manage diverse customer information. The database schema is designed to accommodate various entities such as customer profiles, interaction logs, and scheduled tasks. MongoDB's document-based storage model allows for efficient data retrieval and manipulation, ensuring that all customer data is easily accessible and manageable. Integration and testing are critical phases in this development process to ensure the system's functionality and reliability. The integration process involves connecting the front-end React application with the backend APIs and ensuring seamless data flow between all components. Testing is conducted at multiple levels, including unit testing of individual components, integrationtesting to verify that all parts of the system work together correctly, and user acceptance testing (UAT) to gather feedback from stakeholders and make necessary adjustments.

Upon performing these actions, the front-end application generates requests that are sent to the backend servers managed by Node.js and Express.js. The backend is responsible for handling these requests securely and efficiently. Node.js, with its event-driven architecture, ensures high performance and scalability, making it suitable for real-time applications. Express.js serves as a web application framework that facilitates the creation of RESTful APIs, which are essential for managing the communication between the frontend and the backend. These APIs process incoming requests, perform necessary business logic, and interact with the database to store or retrieve data. The website for Graph magic was designed to include the following key sections:

Step 1

Registration Page:(user side page): The registration page allows new users to sign up for the CRM system. It typically includes fields for entering personal information such as name, email address, and password. Upon submission, the system creates a new user account, providing access to the CRM functionalities.

Step 2

Contacts/User List:(Admin side page): The contacts or user list section displays comprehensive list of all contacts or users stored in the CRM system. It provides essential information about each contact, such as name, email address, phone number, and any additional details. Users can search, filter, and manage contacts from this centralized interface.

Step 3

Recent: (Admin side): The recent section, accessible from the admin side, presents a summary of recent activities or interactions within the CRM system. It may include details such as newly registered users, recent appointments scheduled, or recent updates to contact information. This section offers administrators quick insights into system activity.

Step 4

Appointment Form: (User side): The appointment form allows users to schedule appointments with clients or colleagues directly within the CRM system. It typically includes fields for selecting the date and time of the appointment, specifying the purpose or agenda, and identifying the participants. Upon submission, the appointment is added to the calendar and relevant parties are notified.

Step 5

Calendar: (Admin side): The calendar provides a visual representation of scheduled appointments and events within the CRM system. It offers users an overview of their upcoming appointments, meetings, and tasks. Users can view their schedule by day, week, or month, and easily manage and update appointments directly from the calendar interface.

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III. RESULT

1) **Registration Page:(user side page)** For users Registering themselves with the Counseller.

Figure 1: Registration Page

2) **Contacts/User List:(Admin side page)**
Here the registered user database will be shown to the admin, with options to export selected contacts to excel sheet, import contact from excel sheet, delete selected contacts, and other required options.

Fig No.2 Contacts/User List:(Admin side page)

3) **Recent: (Admin side):** This page will act as notification or the latest entries page for the admin where if any new entries are done either in registration form or book an appointment form it will be displayed here.

Fig No 3. Recent: (Admin side)

3) **Appointment Form: (User side)** If someone wishes to enroll him selves for an appointment session than he/she will have to fill this form. Once a timeslot for a particular day is booked another user will not be able to choose the same slot.
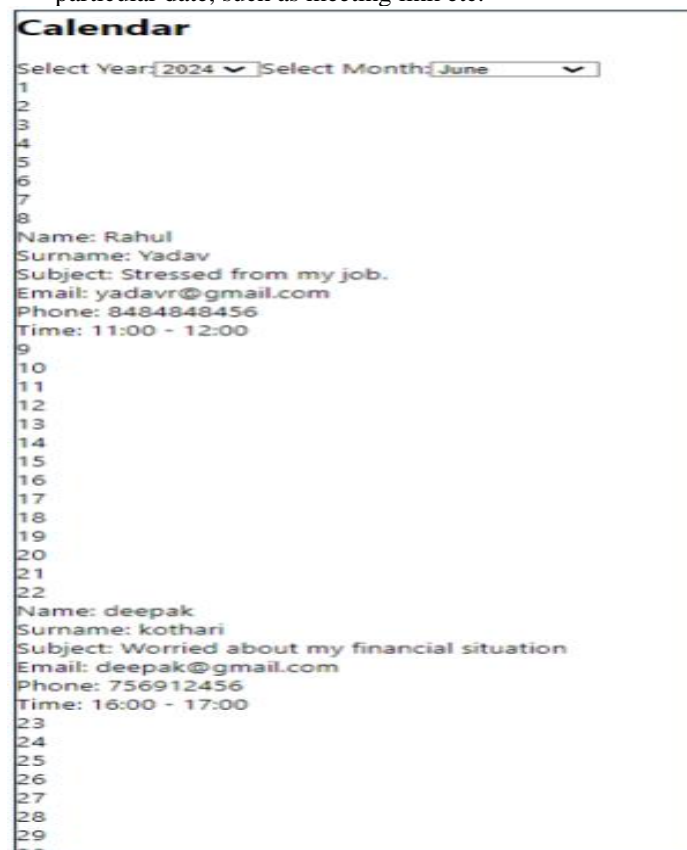
Figure 4: Appointment Form

4) **Calendar: (Admin side)** Here the Counseller will have a record of the scheduled counselling's. (More things can be added in the block of a particular date, such as meeting link etc.

Fig No 5. Calander

V. CONCLUSION

we successfully completed our software CRM with the help of various tools. We investigated the characteristics of a good software system, and considered what a development process would need to include to build such a software. This software provides more convenient way of handling and marketing services to the client/users. It helps a company to align it's strategy with the needs of the customer in order to best meet those needs and thus ensuring long-term customer loyalty.

E-commerce is almost everywhere from selling/buying products, services and keeping digital cart e-commerce is everywhere. Not only it is popular but also the requirement of today's era when people are digitally connected everywhere and everything is just a click away. This project is build on a technology stack called MERN stack which facilitates the digital payment gateway interface, sorting of products based on lowest or highest price, searching the product by its name. It also has an functionality of storing user information like profile and history of searched items and all this happening over MongoDB a database server that store, retrieve and facilitates data. In Current computing based e commerce,

B2B commerce B2C commerce is very popular and growing at pace. As compared to the previous models, the proposed model exhibits far better results as far as the consumer and retailer are concerned. Furthermore, the successful implementation of the website not only enhanced Graph magic's online presence but also provided invaluable learning experiences for the development team. Through their involvement in the project, team members gained hands-on experience in various aspects of web development, from conceptualization and design to codingand deployment. The collaborative nature of the project allowed team members to exchange ideas, tackle challenges, and learn fromeach other's expertise, contributing to their professionalgrowth and skill development. Additionally, the feedback received from Graph magic's stakeholders throughout the development process provided valuable insights into user preferences and industry trends, further enriching the team's understanding of effective web design and user experience principles.

CRM functionality is expanding to include different divisions of business or just spreading across teams to increase productivity and efficiency. Some additional CRM features are:
• Management of products, pricing, and catalogues.
• Professional services project and contract management.
• Human resource management.
• Management of service and field engineers. E-CRM: E-CRM (electronic customer relationship management) is the use of Internet-based technologies including emails, websites, chat rooms, forums, and other channels to fulfil CRM goals. CRM is a very well structured and coordinated process that automates marketing, sales, and customer care procedures. An efficient E-CRM improves the efficiency of operations, improves customer interactions, and allows companies to adapt goods and services to meet the demands of individual consumers

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